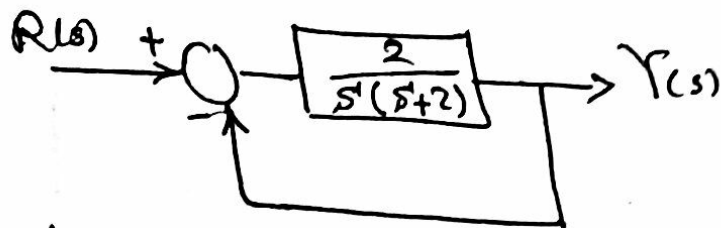


1) For the system has T.F = $\frac{\omega_n^2}{s^2 + 2\zeta\omega_n s + \omega_n^2}$,

if the maximum overshoot equal to 5% and settling time 2sec, Find ζ , ω_n

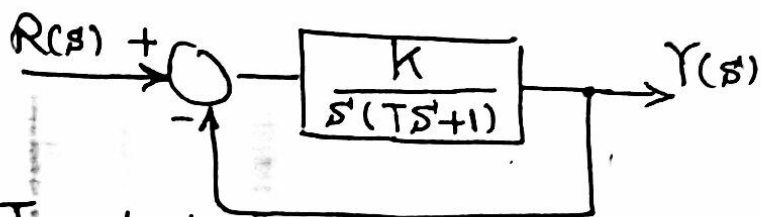
2)



① Find M_p , t_p , t_r , t_s (2% error)

② Find the o/p $y(t)$ and draw it for unit step i/p

3)

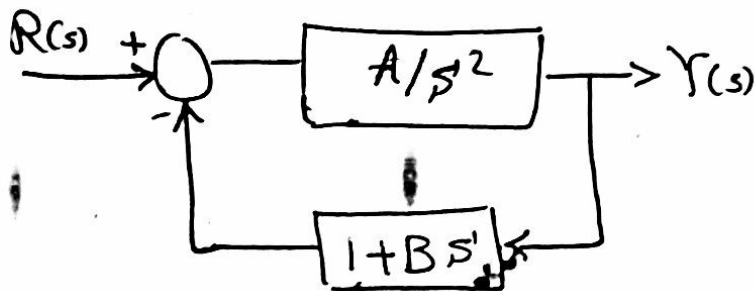


Find K , T which make maximum peak of 0.254 at time = 2 sec

4) Repeat prob. 2 for the system has T.F:

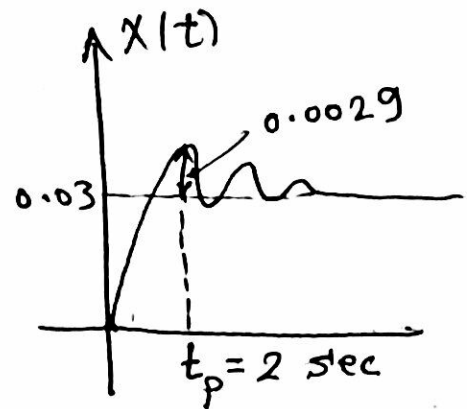
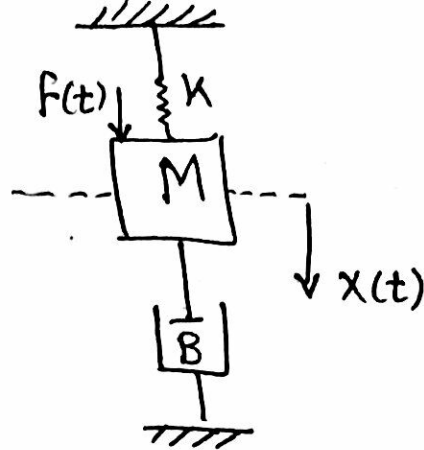
$$\frac{C(s)}{R(s)} = \frac{18}{2s^2 + 8s + 25}$$

5)



Find A , B so that the peak time is 5 sec, and Maximum overshoot is 50%.

6



When we applied 8.9 N of force, the mass oscillates as shown, Determine M , B and K

7 For the following open loop system:

(i) $G_H(s) = \frac{4}{s+1}$

(ii) $G_H(s) = \frac{6(s+3)}{(s+2)(s-6)}$

(iii) $G_H(s) = \frac{5}{s(s^2-3s+5)}$

(iv) $G_H(s) = \frac{10}{s^2(s^2+2s+1)}$

(a) What is the system type and order?

(b) Find K_p , K_v and K_a

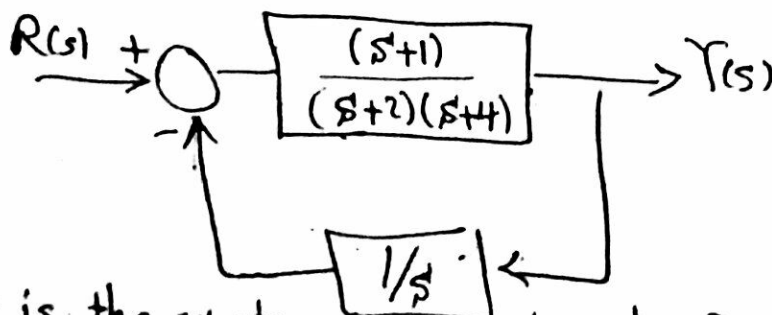
(c) For unity feed back closed loop system find the steady state error for

① $r(t) = 1$

② $r(t) = 1 + 2t$

③ $r(t) = 1 + 2t + 4t^2$

8



(a) What is the system type and order?

(b) Find the steady state error for unit step i/p.